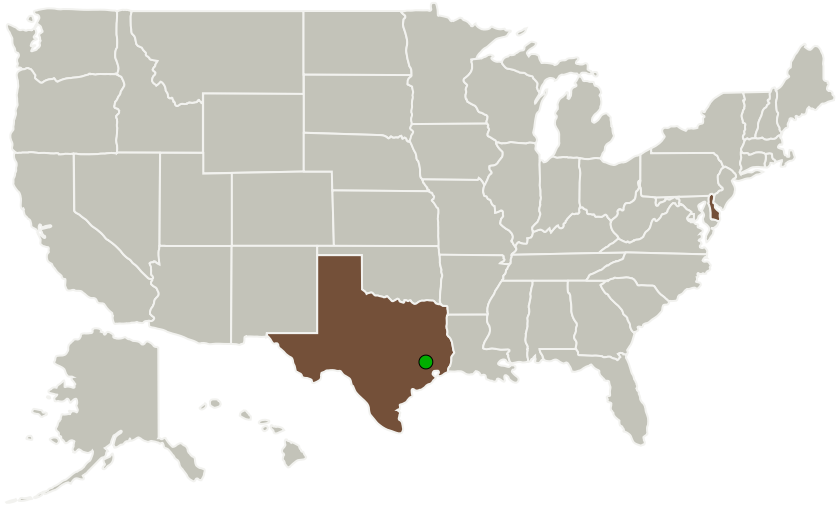
# High Performance Ka Band Power Amplifiers for Future EVA Radio Applications, Phase I

Completed Technology Project (2011 - 2011)

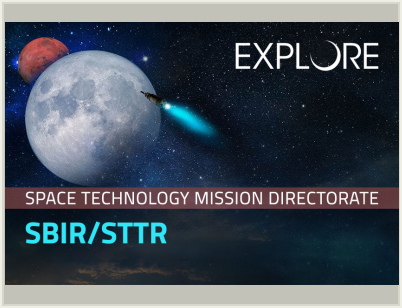
## Project Introduction

In this proposal, AlphaSense, Inc. and the University of Washington detail the development of a novel, high performance Ka band power amplifier for EVA radio applications. Key innovations of our approach include: a) The application of a class-E power amplifier to ensure high power efficiency, b) The EER power amplifier topology to enhance the linearity performance of the class-E amplifier, and c) a novel design of a CMOS class-G dual-supply modulator to further improve the power efficiency for modern modulation signals with high peak-to-average ratios. With such innovations, the proposed Ka band power amplifier has the following merits: a) Small form factor and low power consumption, b) Excellent linearity performance and large dynamic range, c) Fully compatible with modern digital signals and modulation techniques, d) Compatible with mature CMOS technology, and e) Extendable for multi-band and multi-carrier applications.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| AlphaSense, Inc. | Lead Organization | Industry<br>Women-Owned Small Business (WOSB) | Wilmington, Delaware |
| Johnson Space Center(JSC) | Supporting Organization | NASA Center | Houston, Texas |

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| Primary U.S. Work Locations | |
|---|---|
| Delaware | Texas |

## Project Transitions

**February 2011:** Project Start

**September 2011:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/138211)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

AlphaSense, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

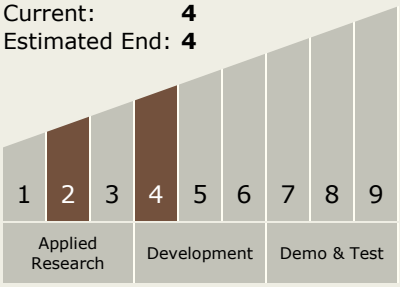
Carlos Torrez

**Principal Investigator:**

Pengcheng Lv

## Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.2 Power-Efficiency

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System